# WATERSHED MANAGEMENT AREA 13

# THE BARNEGAT BAY DRAINAGE

The watershed management area includes watersheds draining the central Atlantic drainage of New Jersey. The area lies mostly in Ocean County and includes the Barnegat Bay as well as the following subwatersheds:

Metedeconk River
Forked River
Toms River
Cedar Creek

**Summary of ambient physical/chemical monitoring stations and classifications:**

| Station | Classification |
|---|---|
| Toms River near Toms River | FW-2 Nontrout |

## OVERALL MANAGEMENT AREA ASSESSMENT

**- Swimmable Support Status:**

| WATERWAY | LOCATION | STATUS |
|---|---|---|
| Toms River | near Toms River | Full Support |
| Barnegat Bay | most monitored sections | Full Support |
| Barnegat Bay | portions within the northern area | Partial support |

**- Summary of Aquatic Life Support Status (Number of stations within each assessment category).** Note: See the Biological Assessment Table located at the end of this section for details regarding macroinvertebrate assessments within the watershed management area.

No Impairment: 35 Mod. Impairment: 22 Severe Impairment: 4

**MAPS here**

# TOMS RIVER

## WATERSHED DESCRIPTION

Toms River drains an area of 124 square miles. It flows from western Ocean and Monmouth Counties southeast to Barnegat Bay at the Town of Toms River, 11 miles north of Barnegat Inlet. This is an area of low relief, containing many small tributaries which feed into the Toms River. The larger tributaries include Davenports Branch, Union Branch, and Wrangle Brook. The watershed also drains a large area of the Pinelands. Major impoundments include Success Lake and Horicon Lake. Population centers include Toms River, Lakehurst, Dover, and Manchester.

This watershed lies in the Coastal Plain and is about one-half forested, with the remainder residential developments, a military installation and agricultural. There has been a substantial amount of new residential and commercial development throughout the watershed in the past five years. Of the approximately 9 NJPDES permitted discharges within the watershed, half are industrial/commercial, and half are municipal/institutional. Waters have been classified as Pinelands (some of the Pinelands waters are also designated trout maintenance), FW-l, FW-2 Nontrout, and SE-1.

## WATER QUALITY ASSESSMENT

### Physical/Chemical Water Quality

**Locations: Toms River near Toms River**

**Dissolved Oxygen:** Acceptable.

**Temperature:** No violations of the upper criterion for non-trout waters.

**Nutrients:** Inorganic nitrogen is acceptable, median value is 0.46 mg/l. Total phosphorous is also acceptable, with only one of 21 samples exceeding the 0.10 mg/l criterion. The median value was 0.03 mg/l.

**Bacteria:** Very low bacterial levels were recorded near Toms River. The geometric mean was 37.8 MPN/100 ml and no sample exceeded the 400 MPN/100ml criterion.

**Summary:** Water quality in the Toms River as monitored near Toms River is very good with respect to nutrients, dissolved solids and sanitary quality. Of note is that sanitary quality appears to be on a long term trend towards better and better quality. In the mid 1980s almost half the bacterial samples were above 200/100ml. By 1990 the assessments found this number of violations to have declined to 14 percent, and the current assessment found no values over 200 (in fact no values above 120).

**Biological Monitoring**
Macroinvertebrate monitoring found non-impaired conditions widespread throughout the Toms River watershed (See the Biological Assessment Table located at the end of this section). Moderately impaired conditions were restricted to Jakes Brook, Sunken Brook, Lower Blacks Brook, Union Branch in Manchester, Maple Root Branch, and a portion of the upper Toms River in Holmson Township.

## POINT SOURCE ASSESSMENT

The Toms River does not suffer from any severe pollution problems, based on the ambient monitoring. A few minor point sources are present in the watershed, but they do not appear to have significant effects on stream quality.

Two hazardous waste sites in the past were suspected of impacting surface waters in the Toms River watershed. They are the Lakehurst Naval Air Engineering Center adjacent to the Ridgeway Branch (aromatics, volatile organics, and metals), and Ciba-Geigy which was suspected to be affecting the Toms River with volatile organics and metals.

## NONPOINT SOURCE ASSESSMENT

Nonpoint source runoff in the watershed has affected water quality from the standpoint of increases in nutrients and stream pH. The streams of the Pinelands region are very susceptible to increases in pH because of their low buffering capacity. Human activity tends to cause increases in stream pH. The predominant nonpoint sources in the Toms River and surrounding watersheds are those associated with suburban development. It is the urban surface runoff and septic systems which are suspected to be primarily responsible for the loss of shellfish harvesting areas in Barnegat Bay. Agricultural inputs appear to be limited largely to the Upper Toms River sub-watershed. Another prominent source of nonpoint pollution in this central New Jersey region is the acid-producing mineral deposits located in the soil. When these soils are exposed to air and water as during construction, they produce sulfuric acid, which when carried away in runoff, acts to depress the pH of the receiving waters.

The upper reaches of the Toms River watershed receive agricultural runoff largely from croplands. It appears that the irrigated fields produce greater runoff problems in contrast to nonirrigated fields. Here, the principal complaint is that runoff is silting-in private ponds. Suburban development has been known to create a wide range of severely deleterious impacts to the Toms River including elevations in fecal coliform levels, turbidity, phosphorus, and dissolved solids, as well as declining dissolved oxygen levels and a decline in the River's suitability for recreational use. These problems were reported to be brought about as a result of the combined impacts of septic tank leachate and urban surface runoff. Housing construction in this watershed has caused increased turbidity and siltation as well as the release of increasing amounts of sulfuric acid from acid producing soils.

In the Lower Toms River subwatershed, suburban development is the primary reported source of nonpoint pollution. Urban surface runoff, storm sewer drainage, and natural pollution were known to have brought about high levels of phosphorus and coliform bacteria, increases in dissolved solids, and a decrease in dissolved oxygen levels. A decline in the recreational use of the waterway had resulted from periodic beach closures which have occurred in the downstream stretches. The lower Toms River and the Union Branch have received impacts from stream encroachment and housing construction. Wrangle Brook, a tributary to Toms River in Berkeley Township, had been reported to be undergoing a decline in water quality resulting from the impacts of urban surface runoff and septic tank leachate. These sources had caused high ammonia levels in the stream and had correspondingly threatened the stream's recreational use.

Pine Lake in Manchester Township has had beach closures because of pollution brought about by urban surface runoff combined with municipal sewage treatment plant effluent.

## DESIGNATED USE ASSESSMENT

The Toms River fully supports the swimmable (primary contact) use in the freshwater sections as monitored near Toms River. The Toms River itself and most of the local tributaries fully support the aquatic life use; partial support is assigned to those tributaries assessed as partially impaired (see Biological Monitoring above). The tidal reaches of the Toms River are classified as condemned for the harvesting of shellfish.

# BARNEGAT BAY

The following discussion, unless otherwise indicated, is drawn from Profile of the Barnegat Bay (NJDEP, 1990). This general discussion has been updated with supplemental material regarding water quality.

Barnegat Bay provides innumerable recreational, economic and aesthetic benefits for New Jersey residents and visitors. Like estuaries almost everywhere, the Bay is experiencing development pressure which may be adversely affecting its water quality and ecology. The watersheds draining to the Bay are among the fastest growing areas in the state. Barnegat Bay is very shallow and this limits its dilution capacity as compared to other bays possessing greater depth. The Bay also possesses a very low flushing rate and a high ratio of estuary volume to fresh water flow. As a result of these factors, relatively small changes in nutrient inputs are likely to have a large impact on bay water quality. In other words, water quality in the Bay is susceptible to degradation because of its high potential to concentrate both dissolved and particulate pollutants.

## Nutrients and Bay Eutrophication

Numerous lines of evidence suggest that, as of 1993, Barnegat Bay is in a moderately eutrophic state (Academy of Natural Sciences, 1993). One of the central concerns revolving around eutrophication in the Bay is that nutrient enrichment may lead to ever increasing phytoplankton blooms which may cause a decline in rooted aquatic plants such as eel grass and, in turn, the fin and shellfish resources that depend upon these grass beds for habitat. Concerns are focused upon the influx of nutrients from direct inputs (such as incoming fresh waters), the resuspension of bottom sediments and the increase in water column turbidity brought about by boat activity (Academy of Natural Sciences, 1993).

## Sanitary Quality

Sanitary quality in Barnegat Bay influences both the value of the resource for primary contact recreation and the fitness of the waters for the harvesting of shellfish for human consumption. Coliform bacteria arise in the Bay from a multitude of sources including failing septic systems, runoff from developed areas, domestic animals, wildlife and boats. Sanitary quality needed to support swimming, as measured along the shoreline through the Coastal Cooperative Monitoring Program (CCMP), is poorest along the northern third of the Bay. The beaches with the highest number of closings in 1996 were Windward Beach in Brick, Hancock Avenue beach in Seaside Heights and Money Island beach in Dover Township. Bacterial levels are greatest after rain events, indicating nonpoint sources. Wet weather also was correlated with elevations in bacterial levels in Bay areas monitored for shellfish harvesting.

**Metals**

Metals in Barnegat Bay are largely contained in the sediments. Sediment samples with high concentrations were found in the most densely populated portions of Barnegat Bay. The presence of metals, despite the absence of major industrial or harbor facilities near the sampling locations, suggests that diffuse sources like urban runoff, fuel and paint used for pleasure boats may be produced in such quantities as to be sufficient to cause substantial sediment contamination in enclosed estuaries. When sediments within the Bay were measured for metals, generally levels were found that could be accounted for by natural background levels characteristic of coastal plain sediments. However, the following locations had moderate or high levels of metals in the sediments not accountable for by background levels:

- Double Creek Channel - moderate to high contamination of arsenic and lead.
- West Creek - high contamination of arsenic.
- Manasquan River - moderate to high contamination with lead and zinc, high contamination with arsenic.
- Metedeconk - moderate to high contamination with mercury, copper, arsenic and lead.
- Toms River - elevated lead levels (attributed to urban land uses in the area).

## DESIGNATED USE ASSESSMENT

The Barnegat Bay fully supports the swimmable (primary contact) use in the sections as monitored by the Coastal Cooperative Monitoring Program. However, certain portions within the northern portion of the Bay are regarded as partially supporting the use because of intermittent and short-term beach closures due to poor sanitary quality.

The majority of open bay waters are fully open to shellfish harvesting (fully supporting the use). Harvesting restrictions are enacted within the northern portion of the Bay from Toms River northward and along most of the shoreline regions of the bay (partially supporting the use).

## BIOLOGICAL ASSESSMENT TABLE: AREA 13

| Mgt Area | Watershd | Site ID | Water Body | Location | Municipality | Sample Date | Biological Impairment Rating |
|---|---|---|---|---|---|---|---|
| 13 | 46 | AN0499 | Metedeconk R N Br | Rt 527 | Freehold Twp | Sep 28, 1994 | non-impaired |
| 13 | 46 | AN0500 | Metedeconk R N Br | Jackson Mills Rd | Freehold Twp | Sep 28, 1994 | non-impaired |
| 13 | 46 | AN0501 | Metedeconk R N Br | Aldrich Rd | Howell Twp | Sep 28, 1994 | moderately impaired |
| 13 | 46 | AN0502 | Metedeconk R N Br | Rt 9 | Lakewood | Sep 28, 1994 | moderately impaired |
| 13 | 46 | AN0503 | Haystack Bk | Southard Rd | Howell Twp | Aug 10, 1994 | moderately impaired |
| 13 | 46 | AN0504 | Haystack Bk | Rt 547 | Howell Twp | Aug 10, 1994 | non-impaired |
| 13 | 46 | AN0505 | Muddy Ford Bk | Greenville Rd | Howell Twp | Sep 20, 1994 | non-impaired |
| 13 | 46 | AN0506 | Metedeconk R N Br | Rt 88 | Lakewood Twp | Sep 20, 1994 | moderately impaired |
| 13 | 46 | AN0507 | Cabinfield Br | Lanes Mill Rd | Lakewood Twp | Sep 20, 1994 | moderately impaired |
| 13 | 46 | AN0508 | Metedeconk R S Br | Leesville-Siloam Rd | Jackson Twp | Oct 29, 1990 | non-impaired |
| 13 | 46 | AN0508 | Metedeconk R S Br | Leesville-Siloam Rd | Jackson Twp | Feb 20, 1991 | non-impaired |
| 13 | 46 | AN0508 | Metedeconk R S Br | Leesville-Siloam Rd | Jackson Twp | May 17, 1991 | non-impaired |
| 13 | 46 | AN0508 | Metedeconk R S Br | Leesville-Siloam Rd | Jackson Twp | Jul 10, 1991 | non-impaired |
| 13 | 46 | AN0509 | Metedeconk R S Br | Jackson Mills Rd | Jackson Mills | Sep 28, 1994 | moderately impaired |
| 13 | 46 | AN0510 | Metedeconk R S Br | Bennetts Mill Rd | Bennetts Mill | Sep 28, 1994 | severely impaired |
| 13 | 46 | AN0511 | Metedeconk R S Br | Cedar Bridge Rd | Lakewood | Oct 18, 1994 | moderately impaired |
| 13 | 46 | AN0512 | Metedeconk R S Br | Chambers Bridge Rd | Brick Twp | Oct 18, 1994 | moderately impaired |
| 13 | 46 | AN0513 | Beaver Dam Ck | Rt 88 | Brick Twp | Sep 20, 1994 | moderately impaired |
| 13 | 46 | AN0514 | Cedar Bridge Br | Moore Rd | Brick Twp | Oct 18, 1994 | severely impaired |
| 13 | 53 | AN0515 | Kettle Ck | New Hampshire Ave | Lakewood Twp | Oct 18, 1994 | non-impaired |
| 13 | 53 | AN0515 | Kettle Ck | New Hampshire Ave | Lakewood Twp | Jan 11, 1995 | non-impaired |
| 13 | 53 | AN0515 | Kettle Ck | New Hampshire Ave | Lakewood Twp | Apr 19, 1995 | moderately impaired |
| 13 | 53 | AN0515 | Kettle Ck | New Hampshire Ave | Lakewood Twp | Jul 18, 1995 | moderately impaired |
| 13 | 53 | AN0516 | Kettle Ck | Moore Rd | Brick Twp | Oct 18, 1994 | moderately impaired |
| 13 | 48 | AN0517 | Toms R | Paint Island Rd | Millstone Twp | Oct 29, 1990 | non-impaired |
| 13 | 48 | AN0517 | Toms R | Paint Island Rd | Millstone Twp | Feb 22, 1991 | moderately impaired |
| 13 | 48 | AN0517 | Toms R | Paint Island Rd | Millstone Twp | May 17, 1991 | non-impaired |
| 13 | 48 | AN0517 | Toms R | Paint Island Rd | Millstone Twp | Jul 10, 1991 | moderately impaired |

## BIOLOGICAL ASSESSMENT TABLE continued:

| Mgt Area | Watershd | Site ID | Water Body | Location | Municipality | Sample Date | Biological Impairment Rating |
|---|---|---|---|---|---|---|---|
| 13 | 48 | AN0518 | Toms R | Rt 571 | Holmson | Oct 12, 1994 | moderately impaired |
| 13 | 48 | AN0519 | Toms R | Rt 528 | Cassville | Oct 12, 1994 | non-impaired |
| 13 | 48 | AN0520 | Toms R trib | Rt 528 | Van Hiseville | Oct 12, 1994 | non-impaired |
| 13 | 48 | AN0521 | Maple Root Br | Bowman Rd | Jackson Twp | Oct 12, 1994 | moderately impaired |
| 13 | 48 | AN0522 | Dove Mill Br | Grawtown Rd | Jackson Twp | Oct 13, 1994 | non-impaired |
| 13 | 48 | AN0523 | Toms R | S Hope Chapel Rd (Rt 547) | Whitesville | Oct 13, 1994 | non-impaired |
| 13 | 48 | AN0524 | Toms R | Rt 571 | Dover Twp | Oct 13, 1994 | non-impaired |
| 13 | 48 | AN0525 | Bordens Mill Br | Colliers Mills WMA | Jackson Twp | Oct 18, 1994 | severely impaired |
| 13 | 48 | AN0526 | Shannae Br | Colliers Mills WMA | Jackson Twp | Oct 18, 1994 | non-impaired |
| 13 | 48 | AN0527 | Ridgeway Br | Rt 571 | Legler | Oct 19, 1994 | non-impaired |
| 13 | 48 | AN0528 | Ridgeway Br | Rt 70 | Manchester Twp | Oct 19, 1994 | non-impaired |
| 13 | 48 | AN0529 | Blacks Br | Naval Air Sta boundary | Manchester Twp | Oct 18, 1994 | non-impaired |
| 13 | 48 | AN0530 | Blacks Br | Rt 70 | Lakehurst | Oct 19, 1994 | moderately impaired |
| 13 | 48 | AN0531 | Old Hurricane Br | Beckerville Rd | Manchester Twp | Nov 14, 1990 | non-impaired |
| 13 | 48 | AN0531 | Old Hurricane Br | Beckerville Rd | Manchester Twp | Mar 12, 1991 | non-impaired |
| 13 | 48 | AN0531 | Old Hurricane Br | Beckerville Rd | Manchester Twp | May 16, 1991 | non-impaired |
| 13 | 48 | AN0531 | Old Hurricane Br | Beckerville Rd | Manchester Twp | Jul 11, 1991 | non-impaired |
| 13 | 48 | AN0532 | Manapaqua Bk | Rt 70 | Lakehurst | Oct 19, 1994 | severely impaired |
| 13 | 48 | AN0533 | Union Br | Colonial Dr | Manchester Twp | Oct 19, 1994 | moderately impaired |
| 13 | 48 | AN0534 | Union Br | Beacon Ave | Pine Lk Pk-Manchester Twp | Nov 1, 1994 | non-impaired |
| 13 | 48 | AN0535 | Toms R | Oakridge Pkwy | Dover Twp | Oct 13, 1994 | non-impaired |
| 13 | 48 | AN0535 | Toms R | Oakridge Pkwy | Dover Twp | Jan 11, 1995 | non-impaired |
| 13 | 48 | AN0535 | Toms R | Oakridge Pkwy | Dover Twp | Apr 19, 1995 | non-impaired |
| 13 | 48 | AN0535 | Toms R | Oakridge Pkwy | Dover Twp | Jul 18, 1995 | non-impaired |
| 13 | 48 | AN0536 | Wrangel Bk | Congasia Rd | Manchester Twp | Nov 3, 1994 | non-impaired |
| 13 | 48 | AN0537 | Wrangel Bk | Mule Rd | Berkeley Twp | Nov 1, 1994 | non-impaired |
| 13 | 48 | AN0538 | Sunken Br | Mule Rd | Berkeley Twp | Nov 3, 1994 | moderately impaired |

## BIOLOGICAL ASSESSMENT TABLE continued:

| Mgt Area | Watershd | Site ID | Water Body | Location | Municipality | Sample Date | Biological Impairment Rating |
|---|---|---|---|---|---|---|---|
| 13 | 48 | AN0539 | Wrangel Bk | S Hampton Rd | Berkeley Twp | Nov 3, 1994 | non-impaired |
| 13 | 48 | AN0540 | Davenport Br | Lacey Rd | Berkeley Twp | Nov 29, 1994 | non-impaired |
| 13 | 48 | AN0541 | Davenport Br | Mule Rd | Berkeley Twp | Nov 3, 1994 | non-impaired |
| 13 | 48 | AN0542 | Jakes Br | Dover Rd | Berkeley Twp | Nov 29, 1994 | moderately impaired |
| 13 | 48 | AN0543 | Jakes Br | Double Trouble Rd | S Toms R | Nov 29, 1994 | moderately impaired |
| 13 | 48 | AN0544 | Toms R trib | Rt 37 | Dover Twp | Oct 19, 1994 | moderately impaired |
| 13 | 62 | AN0545 | Webbs Mill Br | Rt 539 | Lacey Twp | Nov 14, 1990 | moderately impaired |
| 13 | 62 | AN0545 | Webbs Mill Br | Rt 539 | Lacey Twp | Dec 1, 1994 | non-impaired |
| 13 | 62 | AN0546 | Cedar Ck | Whiting Lacey Rd | Bamber Lk-Lacey Twp | Dec 1, 1994 | non-impaired |
| 13 | 62 | AN0547 | Factory Br | Whiting Lacey Rd | Lacey Twp | Dec 1, 1994 | non-impaired |
| 13 | 62 | AN0548 | Cedar Ck | Double Trouble St Pk | Lacey Twp | Dec 1, 1994 | moderately impaired |
| 13 | 62 | AN0549 | Cedar Ck | Rt 9 | Lanoka Harbor | Dec 1, 1994 | non-impaired |
| 13 | 67 | AN0550 | Long Br | | Lacey - Ocean Twp boundary | Dec 13, 1994 | non-impaired |
| 13 | 67 | AN0551 | Forked R N Br | @ powerlines | Lacey Twp | Nov 29, 1994 | moderately impaired |
| 13 | 67 | AN0552 | Oyster Ck | Rt 532 | Ocean Twp | Dec 13, 1994 | non-impaired |
| 13 | 67 | AN0553 | Waretown Ck | Rt 9 | Waretown | Dec 13, 1994 | non-impaired |
| 13 | 67 | AN0554 | Four Mile Br | Oxycocus St | Manahawkin | Dec 20, 1994 | non-impaired |
| 13 | 67 | AN0555 | Mill Ck | Rt 72 | Manahawkin | Dec 13, 1994 | moderately impaired |
| 13 | 67 | AN0556 | Cedar Run | Rt 9 | Mayetta | Dec 20, 1994 | non-impaired |
| 13 | 67 | AN0557 | Westecunk Ck | Forge Rd | Eagleswood Twp | Dec 20, 1994 | non-impaired |
| 13 | 67 | AN0558 | Westecunk Ck | RR Ave | W Ck | Dec 20, 1994 | non-impaired |
| 13 | 67 | AN0559 | Mill Br | Nugentown Rd | Nugentown | Dec 20, 1994 | moderately impaired |